

Vertebral artery dissection and high-intensity workouts

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ABSTRACT

This case describes a 59-year-old athletic man who developed a lateral medullary stroke from a vertebral artery dissection after a CrossFit-style overhead lifting workout. The patient presented for dysarthria and a right-sided facial droop upon waking. A secondary evaluation of the computed tomography angiogram, in corroboration with exercise history obtained much later, led to the diagnosis of right vertebral artery dissection. Cerebral artery dissection is commonly seen following exercise-induced trauma.

KEYWORDS CrossFit; exercise-induced trauma; stroke; vertebral artery dissection

Up to 40% of spontaneous cerebrovascular dissections are attributed to mild cervical trauma, which is often exercise induced.¹ The data have been well studied in younger adults, which aligns with age groups seen participating in high-intensity workouts, such as CrossFit. With over 5000 CrossFit gyms or affiliates in the US alone,² the sport is gaining popularity not only with the young, but also with aging athletes.

CASE DESCRIPTION

A 59-year-old man presented to the emergency department after noting slurred speech and right facial drooping upon waking that morning. He described not feeling well with profound sweating. His medical history included bipolar disorder and depression. Computed tomography (CT) of the head without contrast showed no acute findings. He was treated with antiplatelets and transferred to a nearby stroke center. Upon admission, the patient was noted to have uvular deviation and mild dysdiadochokinesis. CT angiogram of the head and neck revealed that the right vertebral artery was asymmetrically small and not definitely visualized distally at the level of the proximal cervical spine and foramen magnum (*Figure 1*).

The following morning, a neurology exam showed only nonspecific dysarthria. An electrocardiogram showed sinus bradycardia, with no findings on echocardiogram and a low-density lipoprotein cholesterol of 90 mg/dL. Magnetic resonance (MR) imaging of the head showed a small acute

infarct in the right posterior lateral medulla (*Figure 1*). Further consultation with a neuroradiologist confirmed dissection of the right vertebral artery. At this time, the patient's symptoms had improved, with only a mild dysarthria remaining. He was continued on aspirin and statin therapy, which was later discontinued as an outpatient. A detailed social history noted the patient started CrossFit-style workouts 6 months earlier and discontinued bupropion 1 week earlier due to improved mental health. The patient was encouraged to refrain from exercise involving the upper extremities for at least 3 months.

At his 6-month follow-up with neurology, the patient's swallowing ability had improved but he noted continued saliva buildup within the oral cavity; otherwise, dysarthria had resolved. Repeat CT angiogram of the head and neck showed a healed dissection of the right vertebral artery. The patient was transitioned to 81 mg aspirin daily, and exercise restrictions were removed.

DISCUSSION

More middle-aged and older adults are participating in high-intensity exercise, which increases not only the risk of injury, but also misdiagnosis. Middle-aged and older adults may be initiating exercise from a long-term hiatus, years removed from formal weightlifting training, and/or their physiology may place them at a disadvantage. Specifically in CrossFit, where emphasis is often placed on time and speed, lifting movements may be compromised for the sake of

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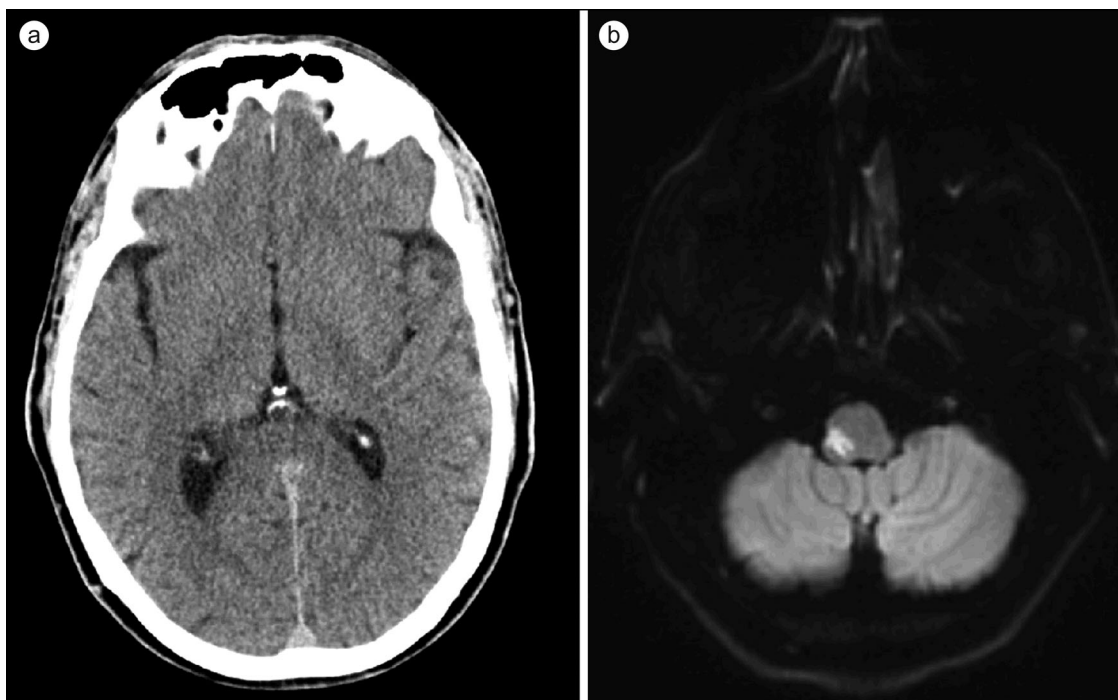


Figure 1. (a) CT angiogram of the head illustrating asymmetry of the vertebral arteries. (b) MRI of the head with a small acute infarct in the right posterior lateral medulla.

competition and winning, with the potential for spinal injuries, among others.³ CrossFit is a multifaceted fitness community and way of life for many participants; however, the priorities of the group can misalign with those of the individual. High-intensity-based exercise must be risk stratified for potential injury and reevaluated periodically, and clinicians must understand the risk factors when advocating exercise regimens for their patients.

Strokes caused by cerebrovascular dissections often present with a range of nonspecific symptoms that often are missed.^{4,5} This case illustrates the impact of age bias and comprehensive history taking. In addition, dissections can also be missed on routine imaging. There remains no gold standard between CT angiogram and MR/MR angiogram for cerebrovascular dissections,⁶ and obtaining both during a workup may offset their respective likelihood ratios. Also, current guidelines for treatment and return to sport are limited and often set by the clinical experience of the provider,⁷ as there is no evidence to date of superiority with anticoagulation vs antiplatelet therapy.⁸ A bias toward age may lead to more aggressive therapy compared with younger patients with the same mechanically triggered event.

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